

Abstract Submitted
for the DPP15 Meeting of
The American Physical Society

The Impact of Zonal Flows on the Performance Predictions for ITER¹ G.M. STAEBLER, J. CANDY, GA — Gyrokinetic turbulence simulations of the core of ITER with the GYRO code have found that the zonal fluctuations produce a significant upshift of the effective critical gradient and a reduction in the stiffness of the energy transport. These results are consistent with previous work on the Dimits shift regime.² These Dimits shift effects are not included in the quasilinear transport model TGLF. Here we report on a model for the Dimits shift effects that has been developed for TGLF and calibrated with GYRO turbulence simulations. The positive impact of the Dimits shift on the TGLF predictions for ITER performance are reported. The model used in TGLF is based on the predator-prey model³ of the saturation of the turbulence. With simple assumptions about the nature of the non-linear damping of zonal fluctuations, the Dimits shift regime observed in the GYRO simulations can be modeled.

¹Work supported by US DOE DE-FC02-04ER54698.

²A. M. Dimits, et al., Phys. Rev. Lett. 77 (1996) 71.

³P. H. Diamond, et al., 2005 Plasma Phys. Control. Fusion 47 (2005) R35

G.M. Staebler
General Atomics

Date submitted: 22 Jul 2015

Electronic form version 1.4